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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,656	07/28/2006	Toshimasa Kumaki	65341.00011	2833
32294 7590 10/28/2009 SQUIRE, SANDERS & DEMPSEY L.L.P. 8000 TOWERS CRESCENT DRIVE 14TH FLOOR VIENNA, VA 22182-6212				
EXAMINER ROE, JESSEE RANDALL				
ART UNIT 1793		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/587,656

Applicant(s)

KUMAKI ET AL.

Examiner

Jessee Roe

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 1, 3-7, 9, 10, 12, 15 and 20-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2, 8, 11, 13, 14 and 16-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date 24 September 2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ ~~Notice of Informal Patent Application~~
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 August 2009 has been entered.

Status of the Claims

Claims 1-25 are pending wherein claims 2, 8, 11, 13-14 and 16-19 are amended and claims 1, 3-7, 9-10, 12, 15 and 20-25 are withdrawn from consideration.

Status of Previous Rejections

The previous rejection of claims 11 and 13-14 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kaufman (US 4,011,077) is withdrawn in view of the Applicant's amendments to claims 11 and 13-14.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 8 and 16-19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kaufman (US 4,011,077).

In regards to claim 2, Kaufman ('077) discloses a method for producing an iron-based alloy wherein an alloyed additive powder having selected alloying ingredients (such as manganese, nickel, molybdenum) blended with the iron-base (iron-carbon-alloy) powder and the additive alloy powder is coated with copper (applied to a surface of the iron-based alloy) and sintered at a temperature in the range of 2060°F to 2080°F (1127°C to 1138°C) (abstract, col. 5, lines 10-25, col. 7, lines 12-31). Kaufman ('077) further discloses that the outer peripheral region of each iron base powder particle will become enriched with carbon and alloying ingredients.

Since Kaufman ('077) discloses substantially similar steps of treating the same or substantially the same composition, the structure "wherein said coating contains a

thickness of at least 0.5 mm and a carbide formed by carbonizing a first element that has a property for increasing hardness of an Fe-based alloy, wherein a second element other than said first element, is contained in said Fe-based alloy, said second element having an amount which is larger in said surface layer portion as compared with said inside portion, and wherein an amount of said first element increases from said surface layer portion in said inside portion" would be expected. MPEP 2112.01 I.

Alternatively, it would have been obvious to one having ordinary skill in the art to modify the size/quantity of the particles of alloy additive powder having ingredients (such as manganese, nickel, and molybdenum) such that thickness of 0.5 mm would be met since the ratio of base alloy powder to additive alloy powder is result-effective in terms of compressibility and cost (economy) (col. 6, lines 45-63). MPEP 2144.05 II.

In regards to claim 8, Kaufman ('077) discloses copper (abstract).

In regards to claims 16-19, Kaufman ('077) discloses chromium, manganese, and nickel (abstract). A carbide of chromium, manganese, and nickel of the form M_6C or $M_{23}C_6$ ((Fe,M)₆C or (Fe,M)₂₃C₆) would be expected since Kaufman ('077) discloses the same or substantially the same composition in addition to the same or substantially the same process.

With respect to the amendment changing "A layered Fe-based alloy" to "A layered Fe-based alloy member" in claims 2, 8 and 16-19, the Examiner notes that the goal of Kaufman ('077) is to produce alloy parts (col. 10, lines 26-29) and there would be no patentable distinction between "a part" and "a member".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 8 and 16-19 are rejected under 35 U.S.C. 103(a) being unpatentable over Tahara et al. (US 5,792,282) alone, or alternatively in view of the ASM Handbook Volume 4.

In regards to claim 2, Tahara et al. ('282) discloses carburizing an austenitic stainless steel, which inherently has an iron-base, comprising 1 to 6 weight percent molybdenum and 13 to 25 weight percent chromium (abstract and col. 2, lines 57-67). Tahara et al. ('282) discloses that carbon diffuses and penetrates the surface to form a deep uniform layer (col. 6, lines 23-29) wherein chromium carbide can hardly be identified and more of the chromium is present in the steel than in the case (col. 8, lines 1-22). The Examiner notes that the structure disclosed by Tahara et al. ('282) is the same as that of the instant invention. Therefore, an increase in hardness from the surface to an inside portion thereof is expected. MPEP 2112.01 I.

With respect to the recitation "and comprising a thickness of at least 0.5 mm" in line 5 of claim 2, merely changing the proportion (thickness) of a prior art product would not be sufficient to distinguish from the prior art. MPEP 2144.04 IV(A).

Alternatively, Tahara et al. ('282) does not specify the thickness of the carburized layer.

The ASM Handbook Volume 4 discloses that by modifying time and/or temperature, a carburized layer thickness of greater than 1 mm can be achieved (pg. 314, col. 2 – pg. 315, col. 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified time and temperature, as disclosed by the ASM Handbook Volume 4, while carburizing as disclosed by Tahara et al. ('282), in order to achieve any desired carburized layer thickness. MPEP 2144.05 II.

In regards to claim 8, Tahara et al. ('282) discloses that the presence of carbon is higher in the surface portion than that of the inside portion (col. 3, lines 30-44 and col. 6, lines 23-29).

In regards to claims 16-19, Tahara et al. ('282) discloses the formation of Cr_{23}C_6 (col. 8, lines 1-23) and the addition of molybdenum for the stabilization of ferrite (iron in solid solution) (col. 3, lines 44-52). Therefore, the presence of $(\text{Fe}, \text{Cr})_{23}\text{C}_6$ is expected.

With respect to the amendment changing "A layered Fe-based alloy" to "A layered Fe-based alloy member" in claims 2, 8 and 16-19, the Examiner notes that Tahara et al. ('282) discloses the formation of stainless steel products and there would be no patentable distinction between a "a product" and "a member".

Claims 2, 8, 11, 13-14 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US 6,680,129).

In regards to claims 2, 8, 11, 13-14, 16 and 18, Wang et al. ('129) discloses making steel articles with hard, wear-resistant carbide coatings (abstract) wherein a niobium carbide, vanadium carbide, or mixed vanadium/niobium carbide coating placed on the steel article by utilizing a chemical deposition process carried out with the aid of immersion in vanadium, niobium or mixed vanadium/niobium powder (col. 2, line 60 – col. 3, line 14). Wang et al. ('129) further discloses that the niobium and/or vanadium draw carbon (second element) from the substrate steel to the surface to form the carbide layer, thereby having a surface layer with more carbon compared with the inside of the steel article (col. 3, lines 3-15), and drawing a small amount of chromium (first element) from the steel substrate in the vanadium, niobium or niobium and vanadium coating (abstract and col. 3, lines 44-55), thereby having chromium (first element) increase from the surface layer to the inside portion.

With respect to the recitation "applying, to a surface of said Fe-based alloy, a powder made up of a substance which contains said second element" in lines 11-12 of claim 11, Wang et al. ('129) discloses mixing chromium with vanadium and niobium in the powder pack (col. 3, lines 44-55).

With respect to the recitation "heat-treating said Fe-based alloy with said powder applied thereto, so that said first element is diffused to said surface layer portion, and said first element reacts with carbon existing in said surface layer portion of said Fe-based alloy to form said carbide" in lines 13-15 of claim 11, Wang et al. ('129) discloses

tumbling in the niobium and/or vanadium and/or chromium powder at 1600°F to 2000°F (col. 4, lines 37-51).

With respect to the formation of a coating with a thickness of at least 0.5 mm in line 6 of claim 11, Wang et al. ('129) discloses heating at 1600°F to 2000°F for a time sufficient to form a coating of desired thickness on the article having a hardness of at least HV2000. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to modify the time at a temperature in the temperature range of 1600°F to 2000°F to achieve the desired coating thickness. MPEP 2144.05 II.

With respect to the recitation "wherein said carbide comprises a compositional formula of M_6C or $M_{23}C_6$ wherein M represents a metal element" in claim 17 and wherein said carbide comprises a compositional formula of $(Fe,M)_6C$ or $(Fe,M)_{23}C_6$ wherein M represents a metal element" in claim 19, the Examiner notes that Wang et al. ('129) discloses forming chromium carbides, niobium carbides, and vanadium carbides (col. 5, lines 5-12). Additionally, because Wang et al. ('129) discloses a substantially similar process and composition, these carbides would be expected. MPEP 2112.01 I.

Response to Arguments

Applicant's arguments filed 21 August 2009 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that Kaufman ('077) fails to describe or suggest each and every element recited in claims 2 and 11. Specifically the Applicant argues that Kaufman ('077) describes that an Fe-C alloy powder is coated, and a

sintered compact is obtained using the coated Fe-C alloy powder; the component coating the powder uniformly diffuses from the surface to the inside of the sintered compact that was obtained by sintering the coated powder and therefore the characteristics are uniformly distributed over the entire sintered compact.

In response, the Examiner notes that Kaufman ('077) teaches that the obtained composition is illustrated in Figure 5, which does not appear uniform. Additionally, although powder may be applied uniformly over a compact to form an intermediate product, the goal of Kaufman ('077) is to produce alloy parts (final product) (col. 10, lines 26-29) which would not be uniform according to the steps of Kaufman ('077) since for instance, Kaufman ('077) prevents the diffusion of carbon by use of a copper barrier (col. 4, lines 24-38).

Second, the Applicant primarily argues that Tahara et al. ('282) describes a conventional surface treatment technique for carburizing austenitic stainless steel and forming hard layers only to depths of 5 to 70 μm and since each of the coating thicknesses described in Applicant's specification (0.5 mm to 15 mm) are magnitudes greater than the surface layer thickness of the conventional surface treatment technique described in Tahara et al. ('282) such a modification of Tahara et al. ('282) in view of the ASM Handbook Volume 4 to achieve a greater thickness and such allegations are based upon hindsight consideration of the Applicant's specification.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon

hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Although Tahara et al. ('282) discloses hard layer depths of 5 to 70 μm , those of ordinary skill in the art know that if a thicker film is desired, then the time and/or temperature of the surface treatment can be modified to achieve the desired thickness.

Third, the Applicant primarily argues that Tahara et al. ('282) merely describes that Cr_{23}C_6 exists in a carburized layer and one of ordinary skill in the art would not have compared an outside layer that coats a base material, as recited in claim 2, with a carburized layer formed by carbon penetration into a base material.

In response, the Examiner notes the means of formation of the Cr_{23}C_6 in Tahara et al. ('282) in claim 2 is of little importance since claim 2 is drawn to a product and not a process. Furthermore, one could change the thickness of this layer by merely the time and/or temperature of the surface treatment, as disclosed by the ASM Handbook Volume 4 (pg. 314, col. 2 – pg. 315, col. 3).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
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/JR/